SOURCE MATERIAL FOR EXPERIMENTS, DEMONSTRATIONS AND PROJECTS IN SCIENCE AND MATHEMATICS

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Submitted to the Faculty of the Graduate School of
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in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
August, 1960

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SCIENCE AND MATHEMATICS

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PREFACE

This type of bibliography is an experimental thing. If it is found to be usable, it is hoped that the Traveling Science Teacher Program directors will see fit to have it improved and keep it current over the years.

Because of self-imposed limits on the amount of material to be quoted, monetary requirements imposed by some publishers and the failure of one publisher (Thomas Y. Crowell Co.) to answer correspondence this bibliography is incomplete in that it does not contain all of the material that was originally planned for inclusion.

Indebtedness is acknowledged to the many gracious and cooperative people of the many publishing companies whose prompt answers and suggestions were most helpful. Here, apologies are in order to those whose hopes were for a more extensive and inclusive work.

Indebtedness is acknowledged also to Mr. Claude W. Gatewood for his patient and valuable guidance, the loaning of personal books and assistance in procuring additional material; to Dr. James H. Zant, his committee and staff for making this possible; to Mr. John B. Stratton, assistant librarian at Oklahoma State University and the multi-

tude of library workers for procuring and finding books: and especially to Alice, my Wife, for help in organizing and typing these many pages.

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INTRODUCTION

This bibliography is as the title implies, specifically for teachers or Science-minded individuals to find books or pamphlets quickly for their individual or class needs. It includes only material for experiments, demonstrations, projects and Math enrichment.

It is commonly known that many teachers in charge of Science classes do not use experiments, demonstrations, projects or outside enrichment material as tools for teaching. The reasons and excuses are logical in some cases and uncalled for in others.

In these times when many teachers are leaving the field for higher paying jobs it often falls upon some one with very little Science background to become the Science teacher. Although this situation is being remedied slowly the lack of qualified Science teachers is a National problem.

There are also many qualified Science teachers in school systems that cannot or do not find a way to provide equipment and materials for adequate Science teaching.

This bibliography is for the teacher with little or no experience, for the teacher with little or no equipment and for the teacher who needs more and better material to

present. There are alsc many suggestions for the experienced teacher to revitalize his or her teaching.

This book list is primarily for the Traveling Science Teacher Program of the National Science Foundation at Oklahoma State University. The books are available in their conference room to use as study or reference material. This list of books is also for the Traveling Teacher group to distribute to Science teachers in need of ideas, fresh material, encouragement or even background material.

Like any list of books, this list should be kept current. As this is the first bibliography of this particular type we can assume the list is current (although we know better). If the included books prove to be of little value for the classroom teacher they should be dropped from the list and others added. In years to come as the list grows it should become more comprehensive and yet more specific through the use of indices.

There is still a greater hope that such lists will become obsolete as more adequately trained Science teachers enter the teaching field with this type of material as an integral part of their training.

Admittedly this list of books and pamphlets is far from complete. A few of the books listed are out of print, but because they are such good books and are still available they are included.

All age groups from beginners to experts are included as far as possible. No material included is beyond the

understanding of a typical high school senior.

It includes sources that require practically no equipment other than what is ordinarily found in the home or that can be purchased for a few cents at a local store. Also included are sources that require equipment that should be found in any school Science program.

It includes the following fields of Science: Biology, Chemistry, General Science, Physics and Mathematics. Some publications include more than one field.

Whenever possible, by copyright release, a typical experiment, demonstration or content sample is included to give the user of the bibliography an idea of the type of material and equipment needed or suggested by a particular publication.

The suggested grade level of usage as given for the individual publications is open to lively debate. Many of the grade levels shown are recommended by the publishers, some are the opinions of the authors, the remainder were mystically chosen by a complicated system called the personal opinion guessing system.

The size type used in the publications is readable for the age level suggested unless otherwise stated (this is also personal opinion).

Although the prices quoted are from current price lists the cost of the publications as listed is subject to error. Many hardcover books are also published as paperbacks and vice versa. Book prices are also subject to change with-

out notice (and they usually do).

Because of the lack of material for Math in the Experiments, Projects and Demonstrations classifications many of the publications for Math are listed as enrichment material.

Many experiments can be used as demonstrations and many demonstrations can be used as experiments.

The footnotes are not uniform because different publishers prefer their credit lines in a specific form, and the specific form requested by each publisher is used.

The publications are listed alphabetically by author and numbered for index convenience. The following abbreviations are used: B, biology; C, chemistry; Gen, general science; M, mathematics; Phy, physics; D, demonstrations; Ex, experiments; Pr, projects and EM, enrichment material. O. P. is used to indicate books out of print.

Example: Book number 6 by Irving Adler is listed as follows:

6. C Gen Phy; D Ex

which means that this particular book is recommended for Chemistry, General Science and Physics teachers and that the material is suitable for demonstrations and experiments. Everything else is self explanatory.

With these few thoughts in mind, any teacher, group leader or individual can find the book or pamphlet and consequently the material needed to perform simply and easily their desired aims.

BIBLIOGRAPHY

1. Phy; D Ex[1]

Adlam, G. H. J., Gumby, S. R. and Pingriff, G. N. (editors); The Science Masters' Book, Series III, Part I; John Murray, Ltd., London; 318 pages, 5 3/4" X 8 3/4", hard cover, $4.25.

Physics; Demonstrations and experiments; High School. Need well equipped lab for most experiments although some suggestions for construction of equipment are given. Book divided as follows: Hydrostatics and mechanics (31), Sound (14), Heat (21), Light (45), Magnetism (13), Electricity (52), Radio (12), Cathode Ray Oscillograph (13). A very well written book.

"Behavior of Air in a Magnetic Field: (W. H. Dowland) A suspension of iron filings in castor oil was being used to demonstrate three-dimensioned lines of force between the poles of a powerful electro-magnet. When the oil was well stirred, bubbles of air became trapped in it, and it was noticed that these settled down on the surface of the

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[1]The following abbreviations are used: B, biology; C, chemistry; Gen, general science; M, mathematics; Phy, physics; D, demonstrations; Ex, experiments; Pr, projects; EM, enrichment material; O.P., out of print.

oil in a straight line at right angles to that joining the poles on the magnet.

The writer is uncertain as to the explanation of this phenomenon, but suggests as a possible explanation the fact that the magnetic properties of a substance are relative to those of the medium in which it is present. Air, relative to vacuum, is paramagnetic, but in this experiment, the air, relative to a medium containing suspended iron, is diamagnetic."[2]

2. C; D Ex

The Science Masters' Book, Series III, Part II; Fowles, G., Coulson, E. H., and Holt, Charles (editors); John Murray, Ltd., 1st edition 1955; 286 pages, (See No. 1).

Chemistry; Demonstrations, experiments; High School.

The book is divided into 6 parts: 1. Apparatus and materials for General Use, 2. Demonstrations for beginning students, 3. Lab exercises for 2, 4. Demonstrations for advanced students, 5. Lab exercises for 4, 6. Small scale methods (of qualitative analysis).

3. B; D Ex

The Science Masters' Book, Series III, Part III; Dyball, R. H., Ramage, H. P., and Rice, C. H. (editors); John Murray, Ltd., 1st edition 1952; 274 pages, (See No. 1).

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[2]Reprinted by permission of John Murray, Ltd, London and the Science Masters' Association.

Biology; Demonstrations and experiments; High School.

Divided into eleven sections: 1. Apparatus (tells and shows how to construct 28 different items among which are a working model of the four-chambered heart and circulation systems, working model of a stomach and a working model of an iron lung). 2. Aquaria, 3. Collection of specimens, 4. Cytology, 5. Experimental techniques, 6. Genetics, 7. Histological technique, 8. Microbiology, 9. Physiology (plant and animal), 10. Preservation of specimens, 11. An appendix on field work.

4. Gen; Ex

The Science Masters' Book, Series III, Part IV; Pub. John Murray, Ltd., London; 1956; 342 pages, (See No. 1).

General Science; Experiments; High School.

Contents: Astronomy (6), Mechanics and General Physics (36), Heat (36), Light (33), Sound (11), Magnetism (9), Current Electricity (27), Electrostatics (11), Chemistry (17), Biology (36), Unclassified (22).

5. M; EM

Adler, Irving; Magic House of Numbers; The New American Library, New York; 1958; 128 pages pocket size paper back, $ .35.

Math; Enrichment material; Grade 6 up.

Book has the following chapter headings: Number curiosities, The dresses that numbers wear, The personality of numbers, Puzzles with numbers, Puzzles without numbers,

Calculation tricks, Card tricks, Games for one, Games for two. Also answers to problems, puzzles and an index.

6. C Gen Phy; D Ex

Adler, Irving; The Tools of Science; From Yardstick to Cyclotron; Illustrated by Ruth Adler; John Day Co., New York; 1958; 128 pages, 5 1/2" X 8 1/4", hardcover, $3.00.

Chemistry, general science, physics; Demonstrations, experiments; Grades 7 (for some tools) up.

Many of the tools such as lenses, rulers, thermometers, scales, levers, etc. that are basic can be used to explain other more complicated tools such as microscopes, seismographs. Even radio telescopes, cyclotrons, cathode ray tubes and the like can be explained to youngsters by explaining simple tools such as magnets, lenses and electrons first.

7. B; Pr

American Dental Association Staff; Dental Projects for High School Science Students; Science Service, Inc., Washington, D. C., publisher; 1959; (American Dental Association); 31 pages, pamphlet, 5 3/8 " X 8 1/2", Individual copies $ .25, ten or more $ .20.

Biology; Projects; Grades 7 - 12.

This book is divided into three sections: Oral anatomy and histology, oral biochemistry and oral microbiology.

8. C; D Ex

Arthur, Paul; Lecture Demonstrations in General Chemistry; McGraw-Hill Book Company, New York; 1939; 455 pages, 5 5/8" X 8 1/4", hardcover, 175 experiments, O.P.

High School up; Need moderatly well equipped lab.

This is one of the best books available for demonstration lecturers. The first chapter should be of interest to all lecture demonstrators (and chemistry teachers in general). The book covers practically all phases of chemistry, plus a section on special apparatus. Most experiments are relatively simple and the procedures are given step by step.

"In a large beaker, place 1 to 2 lb. of dried prunes and cover them with a heavy sugar solution. Similarly, arrange a beaker in which prunes are covered with distilled water. Allow both to stand overnight, then compare them. The prunes covered with syrup will remain wrinkled and small; those covered with water will be swollen and smooth owing to osmosis.

The reverse of this experiment may be shown by immersing a fresh prune in a concentrated sugar solution and letting it stand overnight. The prune will shrink and become quite wrinkled. The principle shown here is often used to kill particularly troublesome plants, the base of the plant being surrounded with rock salt and water being added."[3]

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[3]From Lecture Demonstrations in General Chemistry by Paul Arthur; pub. by McGraw-Hill Book Company, New York.

9. Gen Phy; D Ex

Atkin, J. Myron, and Burnett, R. Will; Electricity and Magnetism; illustrated by Raymond Perlman; Rinehart & Company, Inc.; New York; 1958; 58 pages, paperback, 6" X 9", $1.00.

General science, physics; Demonstrations, experiments; Kindergarten - 6th grade; Equipment around the house, 5 & 10¢ store or some other local store.

The 74 experiments are graded. There is an overview of Electricity and Magnetism for the teacher. Experiments are explained clearly and are illustrated. This is one of a series of four very good booklets for elementary school science. They are listed as elementary books but many parts of each can be used in Jr. High and High School.

"Magnetic Effects of the Electric Current.

Materials: Dry cell, insulated copper wire, a compass.

Connect the bare ends of the insulated copper wire, a to the terminals of the dry cell. Now bring the compass near the wire. Notice whether the compass needle moves. Moving the wire and the compass as little as possible, connect and disconnect one end of the connections to the dry cell terminal. The compass needle will move each time the wire is connected to the terminal, indicating that the flow of electric current produces a magnetic effect."[4]

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[4]Reproduced by special permission of the publisher, Holt, Rinehart and Winston, Incorporated.

10. Gen; D Ex Pr

Atkin, J. Myron and Burnett, R. Will; Air, Winds and Weather; Rinehart & Company, Inc., New York; 1958; 58 pages, 71 experiments, 6" X 9", paperback, $1.00.

General science; Experiments, projects, demonstrations; Elementary; Equipment easily made or found around the house.

Simple instructions and good illustrations included for making weather instruments. As the other books in this elementary science activities series it is a goodie.

11. B; D Ex Pr

Atkin, J. Myron and Burnett, R. Will; Working with Animals; Rinehart & Company, Inc., New York; 1959; 67 pages, 76 activities, 6" X 9", paperback, $1.00.

Biology; Experiments, demonstrations, projects; Kindergarten to 6th. Equipment easily made or purchased except for a microscope or microprojector.

Includes collecting, keeping, breeding, etc. of protozoa and other animals without backbones, fish, amphibians, reptiles, birds, mammals.

12. B; D Ex

Atkin, J. Myron and Burnett, R. Will; Working with Plants; Rinehart & Company, Inc., New York; 1959; 58 pages, 102 activities, 6" X 9", paperback, $1.00.

Biology; Demonstrations, experiments; Graded activities, Kindergarten to 6th grade; Most equipment easily found although a microscope is needed.

13. Gen; Pr

Baker, John H. (ed); The Audabon Guide to Attracting Birds; Doubleday, Doran and Company, Inc., New York; 1941; Copyrighted by the Audubon Society; 268 pages, O. P.

General Science; Projects; All ages.

Includes: How, when and where to Look and Listen, Bird Photography and Banding, Attracting by Planting, by Artificial Feeding, by Providing Nesting Boxes and by Providing Water, Attracting Waterfowl by Creation of Watered Areas, Our Attitude Toward Predators (balance of nature concept), Trespass and Your Rights, Maintenance of Sanctuaries and Protecting Wildlife.

The chapter on trespassing would be of interest to hunters and fishermen as well as to those interested in birds and wild life.

14. M; EM

Bakst, Aaron; Mathematical Puzzles and Pastimes; D. Van Nostrand Company, Inc., Princeton, N.J.; 1954; 206 pages, 5 3/4" X 8 1/2", hardcover, $4.00.

Math; Enrichment material; Grade 6 up.

Includes: Match games, a billiard ball computer, notch arithmetic (base system), different counting systems, counting methods of other countries, time, a perpetual calendar, geometry, trgonometry and other odds and ends.

15. B Gen; Pr

Barton, Roger; How to Watch Birds; McGraw-Hill Book Company, Inc., New York; 1955; 229 pages, 5 1/2" X 8 1/4", hardcover, $3.50.

Biology, general science; Projects; Grade 8 up.

Defines bird watcher, tells where to find birds, how to approach and identify birds, what to feed them, about baths and feeders, how to build boxes and shelters, plantings that attract birds, how to choose and take care of magnification glasses, books you should read, how to keep records, about field trips, watching at night, banding, collecting nests, photographing birds, clubs, how some birds got their names and short sketches of some famous bird watchers.

16. Gen Phy; D Ex

Beeler, Nelson F. and Branley, Franklyn M.; Experiments with Airplane Instruments; Crowell Company, New York; 1953; 115 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

General science, physics; Demonstrations, experiments; Grades 5 - 9.

The authors tell about linkage, fuel gauge, oil pressure gauge, temperature gauge, manifold pressure gauge, tachometer, altimeter, air speed indicator, band indicator, directional gyro, artificial horizon, rate of climb indicator, automatic pilot and illustrates how each works with diagrams, simple experiments and simple devices.

17. Gen Phy; D Ex

Beeler, N. F., Branley, F. M.; Experiments with Atomics; illustrated by A. W. Revell; Crowell Company, New York; 1954; 160 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

General science, physics; Demonstrations, experiments; Grades 5 - 8.

Starts with basic electrical charges and ends with radiosiotopes. Clear explanations and drawings. 17 sections.

18. Gen Phy; D Ex

Beeler, N. F., Branley, F. M.; Experiments with Electricity; Crowell Company, New York; 1949; 145 pages, 5 1/2" X 8 1/4", hardcover, $ 2.75.

General science, physics; Demonstrations, experiments; Grades 4 - 7.

With the exception of a soldering iron, tin snips, and other things generally used for beginning electrical experiments, everything can be found around the house or borrowed from a neighbor.

19. Gen Phy; D Ex

Beeler, N. F., Branley, F. M.; Experiments with Light; illustrated by Anne Marie Jauss; Crowell Company, New York; 1957; 143 pages, 5 1/2" X 8 1/4", hardcover, $3.50.

General science, physics; Experiments, demonstrations; Grades 7 up.

These experiments make more use of boxes, mirrors and glass than the other books in the series. As in the others though, most equipment is around the house or easy to find.

Seventeen sections of very well presented material. Excellent drawings.

20. B Gen; D Ex

Beeler, N. F., Branley, F. M.; Experiments with a Microscope; illustrated by Anne Marie Jauss; Crowell Company; New York; 1957; 154 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

Biology, general science; Demonstrations, experiments; Grade 6 up.

Simple materials (other than a microscope).

Begins with explaining microscopes and how they work. Includes making mounts, keeping records, culturing protozoa, molds, observing bacteria and photomicrography.

21. Gen Phy; D Ex Pr

Beeler, N. F., Branley, F. M.; Experiments in Optical Illusion; illustrated by Fred H. Lyon; Crowell Company, New York; 1951; 114 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

General science, physics; Demonstrations, experiments, project(1); Grades 5 - 9.

A collection of illusions with explanations. A device, called a reflectoscope for copying drawings, pictures, etc., could be used as a project.

22. Gen Phy; D Ex Pr

Beeler, N. F., Branley, F. M.; Experiments in Science; illustrated by Ruth Beck; Crowell Company, New York; 1955; 144 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

General science, physics; Experiments, demonstrations, projects; Grades 4 - 7; Equipment found around the house.

47 sections each with at least one experiment, the most interesting of which is the one that tells how to make a water-drop microscope.

23. Gen; Ex

Beeler, N. F., Branley, F. M.; More Experiments in Science; illustrated by A. W. Revell; Crowell Company, New York; 1950; 176 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

General science; Experiments; Grades 5 - 8; Most equipment around home or easily procured.

37 sections, an extension of Experiments in Science (number 22).

24. C Gen; D Ex

Beeler, N. F., Branley, F. M.; Experiments in Chemistry Crowell Company, New York; 1952; 152 pages, 5 1/2" X 8 1/4", hardcover, $2.75.

Chemistry, general science; Experiments, demonstrations; Grades 7 - 9; Equipment: All items ordinarily found in the home except india ink and hypo which are easily obtained.

This book contains 26 chapters, each chapter hasone or more experiments dealing with a specific idea and a lecture on related ideas. Some of the chapter titles are: Salt as an Electrolyte, Crystals, Emulsions, Corrosion, Dyes, Enzymes.

25. Phy; D

Beiser, Germaine and Arthur; Physics for Everybody; E. P. Dutton and Co., Inc., New York; 1956; 191 pages, 5 1/2" X 8 1/4", hardcover, $3.50.

Physics; Demonstrations(explanations); Grade 7 up.

The simplified easy to understand approach can be used effectively as introduction in Jr. High and High School physics followed of course by more rigorous physics.

26. Gen; Ex

Bischof, George P.; Atoms at Work; Drawings by Jere Conovan; Harcourt, Brace and Company, New York; 1951; 130 pages, 15 (experiments) things to do; 5 1/2" X 8 1/4", hardcover, $ 2.75.

General science; Experiments; Grades 5 - 8; Equipment: Around the house and inexpensive.

The story of atoms. Beginning with molecules, ending with atomic power and the progress of science.

27. Gen; Ex Pr

Blough, Glenn O., and Campbell, Marjorie H.; Making and Using Classroom Science Materials in the Elementary School; illustrated by John J. O'Rourke; Dryden Press, New York; 1954; 229 pages, 5 1/2" X 8 1/4", hardcover, $3.95.

General science; Experiments, projects; Elementary and Jr. High School.

This book tells and shows with well done diagrams and well chosen photographs how to make many simple devices and

tools to illustrate concepts and principles. A few things like switches, batteries and bulbs found in an inexpensive science kit are necessary, all other equipment can be found around the house. Covers the following areas: Animals and plants in the classroom, earth and sky, air, weather and aviation, magnetism and electricity, sound, heat, light, machines. Also a section on sources of materials.

28. B Gen; D Ex Pr

Boyd, Helen W.; Simple Experiments in Biology for Home and School; illustrations by Karol Kincaide; J. Weston Walch, Publisher, Portland, Maine; 1959; 157 pages, 8 1/2" X 11", paperback, $2.50 (ten or more, $2.00).

Biology, general science; Experiments, demonstrations, projects; Grades 6 - 12.

Most experiments are illustrated. Most biological materials range in price from 10¢ to $1.00. Many good ideas on construction of equipment and substitute equipment are given. The experiments, as the title implies are designed for school or home.

"Grow Your Own Pineapple

You do not have to live on a tropical island to grow your own pineapple if you will have patience and take care of your plant.

Fill a gallon can or a large flower pot with equal parts of rich garden soil and humus or peat moss. Cut the leafy top out of a fresh pineapple, remove the leaves from

the bottom of the stalk to a height of about one or two inches, and then plant in your prepared pot. Keep the soil moist and well packed around the stem. In a few weeks it will be firmly rooted and will start adding new leaves at the top. It will make an attractive house plant that needs little care except watering. It may be kept out of doors all during the warm months where it can receive direct sunlight during part of the day. As the pineapple grows it may be transplanted to larger cans or pots. If you will protect this plant from freezing, you will be rewarded with a beautiful bloom and later the fruit. The plant grown in this way must be three to four years old before it bears."[5]

29. B; D Ex Pr

Boyd, Helen W.; Successful Devices in Teaching Biology; J. Weston Walch, Publisher, Portland, Maine; 1957; 211 pages, 8 1/2" X 11", paperback, $2.50.

Biology; Demonstration, experiments, projects; Grades 9 - 12.

This book has over 200 suggestions for arousing interest, maintaining interest, trips, projects, etc., from biology teachers all over the nation. The author also includes a unit on projects.

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[5]Helen W. Boyd, Simple Experiments in Biology for Home and School; J. Weston Walch, Publisher, 1959.

"Perhaps the most effective special project that I carry out is incubation of eggs to study vertebrate development. This project coincides with our study of birds and Easter too. We break eggs after twenty-four hours incubation and then continue this procedure for some time. After the embryo is decidedly chick-like we allow the remainder to continue hatching. This project seems very worth while and does create a great deal of interest and enthusiasm."[6]

30. Gen Phy; D

Boys, C. V.; Soap Bubbles and the Forces that Mould Them; Doubleday and Company, Inc., New York; 1959; 156 pages, paperback, pocket size, $.95.

Physics, general science; Lecture demonstrations; Grades 7 up.

Book divided into three parts:

I. Bubbles classic and common, capillarity, why it is possible to go to sea in a sieve, curvature of water skin, the different skins of water, ether, benzine, grease and camphor, waterbombs or catboxes, balls and sheets of water, oil balls and planets, strength and weight of liquid skins.

II. Why skin of water is elastic, pressures of large and small bubbles, bubbles stretched into tubes and cylin-

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[6]Helen W. Boyd; Successful Devices in Teaching Biology; J. Weston Walch, Publisher, Portland, Maine; 1957.

ders, surface of no curvature absurdity, catenoids, modiods, spider beads, water jets.

III. More on jets, noises of jets, other types of surfaces, double bubbles, conductance of bubbles, implication of bubbles.

Then a section on how to set up and perform the experiments described.

31. M; EM Pr

Brandes, Louis Grant; Yes, Math Can Be Fun; J. Weston Walch, Publisher, Portland, Maine; 1960; 263 pages, 8 1/2" X 11", paperback, Teachers edition $2.50, Student edition (no answers) $2.00.

Math; Enrichment material, projects; Grades 7 - 10. Equipment; paper, pencil, thinking cap.

Book divided into the following parts: Number oddities (relationships), puzzles, tricks and games, facts and stories, objective tests (recreational), illusions, problems (recreational), projects, and answers to all problems requiring solutions.

"The Man and His Two Small Boys. A man and his two small boys wanted to cross a river in a small boat. The boat was too small to carry them all, but would hold either the man or the two small boys. All three crossed the river in the boat. Can you explain how they were able to do so?"[7]

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[7]Louis Grant Brandes; Yes, Math Can Be Fun; J. Weston Walch, Publisher, Portland, Maine, 1960.

32. Gen Phy; D Ex Pr

Branley, Franklyn M.; Experiments in the Principles of Space Travel; illustrated by Jeanyee Wong; Crowell Company, New York; 1955; 119 pages, 5 3/8" X 8 1/4", hardcover, $2.00.

General science, physics; Experiments, demonstrations, projects; Grades 6 up.

A common sense approach to space travel which dispels the fantasy and misinformation as presented in movies, comic books and on television. Nine sections of interesting material.

33. Gen; Pr

Brooks, C. F.; Why the Weather; Harcourt, Brace and Company, New York; 1935; 295 pages, 5 1/4" X 8", hardcover $4.75.

General science; Projects; Grades 7 thru 12.

This book tells about instruments and what they indicate, the different seasons, humidity, clouds, wind and weather, rain, proverbs, mountain weather, thunderstorms, hail, tornadoes, waterspouts, lightning (rods and fertilizer), hurricanes, forecasting, troposphere, stratosphere, snow, radio and aviation.

The section on aviation is outdated. There are 52 excellent photographs. The book is old but good.

34. Gen; Pr

Buck, Margaret Waring; Pets from the Pond; Abingdon Press, New York-Nashville; 1958; 72 pages, 8 1/8" X 10 1/2", hardcover, $3.00, paperback, $1.75.

General science (nature study); Projects; Grade 3 up.

Tells how to find, catch, feed, carry plants, snails and clams, fishes, tadpoles and frogs, salamanders, turtles, crayfishes and insects. Also how to build and buy aquariums.

"To carry the snails and clams home, use a container such as a glass jar with a metal screw top that has holes punched in the top, a small pail, or a can with holes punched in the lid. Partly fill the container with pond water. Several jars or cans can be carried in a fruit basket."[8]

35. Gen; Ex

Burnett, R. Will; Teaching Science in the Elementary School; Rinehart & Company, Inc., New York; 1953; 541 pages, 7 1/4" X 10 1/4", hardcover, $6.50.

General science; Experiments; Elementary and Jr. High; Some of the basic items in an inexpensive lab kit are necessary, many items can be found around the house.

"Inflate two toy balloons and tie them, one to each end of a light dowel rod or yardstick. Suspend the rod

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[8]From PETS FROM THE POND by Margaret Waring Buck, Copyright © 1958 by Abingdon Press. Used by permission of Abingdon Press, publishers.

by a thread from an overhead support and move the thread as needed until the rod balances. It is important that the air in the room remain static as balancing the balloons is a somewhat delicate operation. Now puncture one of the balloons by thrusting a needle through its neck where the rubber is not stretched. The inflated balloon will go down because of the weight of the compressed air inside."[9]

36. C Gen Phy; D

Burruss, A. P.; Demonstrations in Science; The Texas Company, Beacon, New York; 1958; 32 pages, 6" X 9", pamphlet, Single copies free to teachers and lecturers only.

Physics, chemistry, general science; Demonstrations; Grades 7 up. This booklet is designed for teachers and lecturers only. Some demonstrations require very little material, some require expensive equipment (example: ultra-violet lamp, Van de Graff generator).

37. Gen; Pr

Cassell, Sylvia; Nature Games and Activities; pictures by Peter Burchard; Harper and Brothers, New York; 1956; 91 pages, 6 1/4" X 8 1/4", hardcover, $2.50.

General science (nature study); Projects; Grades 4 - 6.

Eight chapters of activities and games. The following subjects are covered: Birds, trees, animals, plants, fish, stars, insects and one chapter on "This 'N' That".

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[9]Reproduced by special permission of the publisher, Holt, Rinehart and Winston, Incorporated.

38. Phy; Pr

Collins, A. Frederick (revised by William J. Kendall and Steven Hahn); The Radio Amateur's Handbook; Drawings by Robert S. King; Crowell Co., New York; 1957; 352 pages, 5 1/4" X 8 1/2", hardcover, $3.95.

Physics; Projects; High School.

This book tells about; electrical fundamentals, electrical parts of a radio, construction techniques, power supplies, vacuum tube principles, receiver theory and construction, how to become a radio amateur, test equipment, setting up and operating an amateur station. The appendix has sections containing commonly used constants, formulas, charts, facts about generators, list of abbreviations, all kinds of kits, insurance requirements, reference material, a comprehensive glossary. Good book on slick paper.

39. All fields; Ex

Conant, James B.; Science and Common Sense; Yale University Press, New Haven, Conn.; 1951; 371 pages, $5.00.

All fields; Experiments; Mainly for teachers.

All teachers of science should read this book. After reading about the import of science on our daily lives and of the misunderstandings of scientists in the past, trouble between scientists as individuals, and even arguments between scientists as representing thoughts of different nations, it might give an entirely different view to what might seem to be absurd questions asked by science students.

40. C Phy; D

Cooley, LeRoy C.; Easy Experiments in Physical Science; American Book Company, New York; 1871; 88 pages, 178 experiments, O.P.

Physics (145), chemistry (33); Demonstration lectures without equipment (if necessary).

This book though old is a classic example of what can be said to convey ideas and principles without equipment. This should never be, but with clear statements as made by Mr. Cooley plus equipment any teacher would be a whiz.

41. B Gen; Pr

Core, Earl L. and Ammons, Nelle P.; Woody Plants in Winter; The Boxwood Press, Pittsburgh, Penn.; 1958; 218 pages, 5 3/4" X 8 3/4", hardcover, $4.00, paperback, $2.75.

Biology, general science; Projects; High School.

A key for identifying woody plants of northeastern United States and southeastern Canada in winter. The key is to genera with descriptions of genera and species.

42. B; D

Corrington, Jullian D.; Exploring with your Microscope; McGraw-Hill Book Company, Inc., New York; 1957; 299 pages, 6 1/4" X 8 1/4", hardcover, $4.95.

Biology, general microscopology; Demonstrations; Grades 9 up.

Tells about history and construction of microscopes, how to use them, how to make accessories, how to catch, collect, prepare and study microcosms and protozoa, also sections on algae, infusions, cloth, minerals, insects, smears, microtomes and sections and a final chapter covering (in who dunit fashion) personal identification, forensic medicine, occupational and regional residues, ballistics and questioned documents. Small print, good pictures and diagrams

43. All Fields; D

Davis, Helen M.; Science Exhibits; Science Service, Washington, D. C.; 1955; 96 pages, 5 1/2" X 8", hardcover, $2.00.

General science, chemistry, physics, etc.; Demonstrations; Grade one up.

The first section tells: the proper attitude with which to approach exhibiting, the purpose of an exhibit, group exhibits. The second section contains 5 accounts of winning exhibits by the originators. The third suggests chemical surprises for demonstrations. The fourth gives display ideas for exhibits and the fifth tells how to put on a show. A stimulating book.

44. Phy; Pr

Davis, Helen Miles; Scientific Instruments You Can Make; Science Service, Inc., Washington, D.C.; 1954; 96 pages, 5 1/2" X 8 3/4", hardcover, $2.00.

Physics; Projects; High School.

This book is a series of reports made by High School students who constructed instruments as projects for the National Science Talent Search conducted by Science Service. It is not a step by step construction book but some reports do have diagrams and photos as necessary parts of the presentation. What the book lacks in step-by-step procedure it makes up for in the inspiration it should impart to the students who need that little extra push to do something of consequence.

A few of the instruments and projects are: Spectroscope, telescopes, celestial photography, Tesla coil, oscilloscope, cloud chamber, atom counters, Van de Graaff generater, electronic computers, ultrasonics, stroboscope and some others.

45. C; D Ex

Davison, Herbert F.; A Collection of Chemistry Lecture Experiments; Chemical Catalog Co.,Inc., New York; 1926; 139 pages, hardcover, O.P.

Chemistry; Demonstrations, experiments; High School.

A handy collection of 69 lecture demonstrations with an introduction entitled "The Art of Lecture Table Demonstrating" which is a message not only to chemistry teachers but to all who perform lecture demonstrations.

46. M; EM

Dudeney, Henry Ernest; Amusements in Mathematics; Dover Publications, Inc., New York; 1958; 258 pages, 5 1/2" X 8", hardcover, $1.25.

Math; Enrichment material; Grade 9 up.

Problems and puzzles in the following classifications; Arithmetical and algebraic, geometrical, points and lines, moving counter, unicursal and ronte, combination and group, chessboard, measuring, weighing and packing, crossing river, concerning games, puzzle games, magic squares, mazes and unclassified. The print is very small but the book has many diagrams and drawings. Solutions included.

47. Gen; Ex Pr

Epstein, Sam and Beryl; The First Book of Electricity; pictures by Robin King; Franklin Watts, Inc., New York; 1953; 69 pages, 7 1/4" X 8 3/4", hardcover, $1.95.

General science; Experiments, projects; Grades 4 - 8. Simple equipment such as batteries, bulbs, wire. Eleven or so experiments (or projects) for youngsters.

A simple easy to understand story of electricity and electrical devices with a few experiments to illustrate concepts.

"Rub a hard rubber object, like a comb, with a piece of wool or silk. Then move the comb close to a small scrap of paper. The negatively charged comb will draw the paper to it. If you rub the comb very briskly it will have a

strong enough charge to make the scrap of paper actually jump almost half an inch through the air."[10]

48. Gen; Pr

Fisher, Robert Moore; How to Know and Predict the Weather; Signet Key; The New American Library, New York; 1958; 144 pages, pocket size, paperback, $ .50.

General science; Projects; Grade 8 up.

This is a book for anyone interested in the weather. It includes the following types of discussions; Make a better guess than the neighbor, a short history of forecasting, the atmosphere, temperature, clouds, pressure and circulation, principal air masses, fronts, interpreting weather maps, fog, winds and forecasting. Appendices include; how to estimate wind speed, forecasting guides and books, facts and figures for the layman. Has photos of different types of clouds.

49. C; D

Ford, Leonard A.; Chemical Magic; T. S. Denison Co., Inc., Minneapolis; 1959; 141 pages, 5 1/2" X 8 5/8", hard cover, $3.50.

Chemistry; Demonstrations; High School; Equipment, chemicals, test tubes, beakers, nothing fancy.

This book contains 102 demonstrations, stunts and

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[10]From The First Book of Electricity by Sam and Beryl Epstein, published by Franklin Watts, Inc., New York, 1953.

tricks to liven up a class and also teach principles of chemistry. A very useful tool for lecture demonstrations.

50. C Gen; D Ex

Fowles, G.; Lecture Experiments in Chemistry; G. Bell and Sons, Ltd, London; American edition by Basic Books Inc., New York; 1939; 564 pages, 5 5/8" X 8 1/2", hardcover, $6.00.

Chemistry, general science; Demonstrations, experiments; Grade 8 up; 547 experiments. A fairly well equipped lab is necessary for the most part.

The "hints on lecture experimentation" as well as the "classes of lecture experiments" part of the introduction should be read. A very comprehensive book.

51. C Gen Phy; D Ex

Frank, J.O. and Barlow, Guy J.; Mystery Experiments and Problems; J.O. Frank, Oskosh, Wis.; 1945; 197 pages, ©.P.

Chemistry, general science, physics; Demonstrations, experiments; Grade 6 up; Some lab equipment needed.

This book is ideal for science club demonstrations and interest building in classroom. It contains 42 chemistry experiments, 53 physics experiments, 18 stunts and illusions and 39 other questions and problems.

52. Gen; D Ex

Freeman, Mae and Ira; Fun with Science; Random House, New York; 1956; 64 pages, 7 5/8" X 10 1/4", hard

cover, $1.50.

General science; Experiments, demonstrations; Grades 7 - 9; Simple equipment found at home; 37 experiments, 52 photographs. Divided into the following sections: Things standing still, things in motion, liquids, water's invisible skin, through the air, sound and music, how heat acts, electricity, light on sight, and atomics.

"Waves act in a very surprising way. Two sets of waves coming from different places can pass right through each other without changing their shape.

Prove this to yourself by tossing two stones into a quiet pond or a large pan of water. One group of round ripples will cross directly through the other. Each will keep its shape, just as if the other were not there at all.

The same thing happens with sound waves. This explains why you can hear one person's words even though other people in the room are talking at the same time. The set of sound waves from each voice goes through the air without mixing up the others."[11]

Freeman, Mae and Ira; See also:
Fun with Astronomy
Fun with Chemistry
Fun with Figures
Fun with Scientific Experiments; All from Random House, Inc.

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[11] From Fun with Science; by Mae and Ira Freeman, Random House, 1956, with permission of the publisher.

53. M; EM

Friend, J. Newton; Numbers Fun and Facts; Charles Scribner's Sons, New York; 1954; 208 pages, hardcover, O.P.

Math; Enrichment material; Grade 8 up.

This book shows how interesting the study of numbers, their peculiarities, traditions, origins, superstitions and legends can be. It is easy to read and requires no great knowledge of numbers to enjoy it. It includes a chapter on palindromes, words and numbers

54. M; EM

Gamow, George and Stern, Marvin; Puzzle-Math; Viking Press, New York; 1958; 119 pages, hardcover, $2.50.

Math; Enrichment material; 38 puzzles in story form.

55. All Fields; D Ex Pr

Goldstein, Phillip; How To Do An Experiment; Harcourt, Brace and Company, New York; 1957; 192 pages, 5 3/4" X 8 5/8", hardcover, $2.60.

All fields; Demonstrations, experiments, projects; Grade 7 up.

This book should be read by all pupils and teachers. It tells how to do an experiment and carry on an investigation from beginning to end. It covers all aspects, gives examples and makes suggestions.

56. Gen; Ex

Grant, Madeleine P.; Wonder World of Microbes; illustrated by Clifford N. Geary; Whittlesey House (McGraw Hill Book Co., Inc.), New York; 1956; 160 pages, 5 1/2" X 8 1/8", hardcover, $2.75.

General science; Experiments (6 experiments); Grades 8 - 12.

This is the story of microbes written for youngsters at their reading level. Tells about molds, yeasts, bacteria, viruses and their effect (good and bad) on man.

57. Gen; Pr

Greenhood, David; Down to Earth; Mapping for Everybody; Holiday House, New York; 1951; 262 pages, $6.00.

General science; Projects; Grade 5 up.

A good general book about maps with one chapter (#10) devoted to "Forming a Collection". Also includes: The Nature of Maps, Coordinates, Great Circles, Scales, Direction, Relief, Projections and Survey.

58. C; D

Hartung, E. J.; The Screen Projection of Chemical Experiments; University of Melbourne Press; 1953; 291 pages, 5 3/4" X 8 7/8", hardcover, $4.75.

Chemistry; Demonstrations; High School up. Requires good projection apparatus.

Contains 250 experiments. Some of the divisions incouded are: General Principles of Optical Projection,

Projection in Polarized Light, General Equipment, Projection Lanterns, Arrangements in the Lecture Theatre, General Demonstration, Properties of Gases, Liquids and Solids, Solubility, Chemical Reactions, Diffusion and Osmosis, Electrochemistry, Interfaces and Surface Chemistry, Colloidal Solutions, Photochemistry, Spectrum Projection and Colour Phenomenon.

59. C Gen; D Ex

Hawk, Burton L.; Experimenting with Chemistry; Science Service, Inc., Washington, D.C.; 1957; 96 pages, 5 5/8" X 7 7/8", hardcover, $2.00.

Chemistry, general science; Demonstrations, experiments; Grades 10 up; Designed for an advanced home lab. 125 experiments.

Experiments of the following types are included: Gas, colors, fire, metals, solutions, electro-chemistry, blowpipe, non-metallic elements.

"Purple ink. We have used twig growths and dried insects; now we shall use wood chips. Logwood or hematoxylon is the heartwood of a Central American tree of the senna family. It contains about 10% hematoxylon with some tannin and resin.

Boil 3 grams of logwood in 12 cc of water until the solution is colored deep red. Then add 3 grams of aluminum sulfate. Boil again for about 10 minutes and while still hot, add 1 gram of gum arabic. Finally, filter the solution.

Commercially, aniline dyes are replacing the natural dyes in most inks. But, perhaps you will find it interesting to prepare inks by the old-fashioned 'natural' method, just for fun."[12]

60. Gen; Ex Pr

Herbert, Don; Mr. Wizard's Experiments for Young Scientists; illustrated by Dan Noonan; Doubleday & Company, Inc., New York; 1959; 187 pages, 5 1/2" X 8 1/2", hardcover, $2.95.

General science; Experiments, projects; All ages; Equipment around the house or neighborhood.

A collection of 13 projects and experiments in 13 different scientific fields. Explanations and drawings are clear, easy to read. A few titles of chapters are: Living-room Zoo(Zoologist), Glue from Milk (Organic Chemist), The World through a Drop of Water and Collector's Items (Geologist).

61. B; Pr

Hillcourt, William; Field Book of Nature Activities; G. P. Putnam's Sons, New York; 1950; 320 pages, 4 1/8" X 7", hardcover, $3.95.

Biology; Projects; Grade School on.

Suggests more than 500 nature activities. Has a 300 project index, 149 simple projects for beginners, requiring

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[12]Burton L. Hawks, Experimenting with Chemistry, Science Service, Inc., Washington, D.C., 1957.

little or no equipment, 112 involving elementary knowledge, sustained effort, some equipment and 39 requiring advanced knowledge, extra effort, special equipment.

The following fields of nature are included: mammals, birds, reptiles, insects, fish, wild flowers and trees. An excellent book.

62. Phy; Ex Pr

Hopkins, G.M.; Experimental Science; Munn & Company, Inc.; 1902; 2 volumes, 6" X 9 1/8", hardcover, O.P.

Physics; Experiments, projects; High School on.

This set though old contains much material of interest to a lecture demonstrator. In volume I, the chapter on sound (VIII) has good accoustical aspect demonstrations.

In volume II, the chapter on lantern projection (IV) modified to more modern equipment should be of interest to all teachers.

Both volumes are filled with good drawings and diagrams. Many good examples of how to construct equipment are shown and explained.

63. Gen; Ex

Hungerford, Harold R., and Drew, Robert E.; Teaching Elementary Science Without a Supervisor; J. Weston Walch, Publisher, Portland, Maine; 1959; 286 pages, 8 1/2" X 11", paperback, $3.00.

General science; Experiments; Grades 1 - 8.

Most equipment necessary available in inexpensive lab kits. Each area covered includes background material for

teachers not fully prepared in all science areas. The included areas are: Life functions of living things, conservation, beyond the earth, the changing earth, chemical and physical change, weather, electricity and magnetism, machines, animals in the classroom, bird boxes and feeders.

"A charge of static electricity can be produced by rubbing an inflated balloon against a wool cloth. The balloon can be placed against the wall where it will remain until the charge leaks away.

It is interesting to charge a balloon and bring it close to one's cheek. What does it feel like? What is happening?"[13]

64. M; EM

Hunter, J.A.H.; Fun With Figures; Oxford University Press, Toronto; 1956; 160 pages, 5 1/4" X 7 3/4", hardcover, $1.50.

Math; Enrichment material; Grade 9 up.

Contains 150 riddles (problems) to solve and the answers.

65. B Gen; D Pr

Hussey, Lois J. and Pessino, Catherine; Collecting Cocoons; illustrated by Isabel S. Harris; Crowell Company, New York; 1953; 73 pages, 6 3/4" X 8 3/4", hardcover, $3.00.

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[13]Harold R. Hungerford and Robert E. Drew, Teaching Elementary Science without a Supervisor, J. Weston Walch, publisher, Portland, Maine, 1959.

General science, biology; Demonstrations, projects; Grades 3 - 7.

Explains the complete non-technical story of the moth and how to raise each of the stages as well as how, when and where to collect them.

66. Gen Phy; D Ex

Jeffs, Frederick; Fun with Physics; Southern Editorial Syndicate, Toronto; 1947; 126 pages, hardcover, O.P.

Physics, general science; Experiments, demonstrations; Grades 8 up.

Most of the usual experiments in elementary physics from the fun approach instead of a work approach (a good idea by the way).

67. Gen Phy; Pr

Johnson, Gaylord and Adler, Irving; Discover the Stars; Sentinel Books Publishers, Inc., New York; 1957; 146 pages, 5 3/8" X 7 5/8", paperback, $ .95.

Physics, general science; Projects; High School.

An introduction and guide to Astronomy for the beginner. Includes directions for building simple instruments.

68. M; EM

Jones, Samuel I.; Mathematical Wrinkles; Samuel I. Jones, Publisher, Nashville; 1930; 361 pages, 5" X 7 1/4", hardcover, $3.00.

Math; Enrichment material; High School.

The following chapters, the titles of which are self explanatory, can be used to advantage; V. Mathematical Recreations, VI. The Fourth Dimension, IX. Short Methods, X. Quotations on Mathematics, XIII. Mathematics Clubs.

69. B Gen; Pr

Klots, Alexander B.; A Field Guide to the Butterflies; Houghton Mifflin Company, Boston; 1951; 349 pages, 4 5/8" X 7 3/8", hardcover, $3.75.

Biology, general science; Projects; Grade 8 up.

A guide to the butterflies for all of North America east of the 100th meridian. Along with the key and many fine photographs (color and black and white), it includes: How to use the book, collecting, preserving, environment, life histories, growth, adult butterfly and classification.

70. B Gen; Pr

Klots, Alexander B.; The World of Butterflies and Moths; McGraw-Hill Book Company, Inc., New York; 1958; 207 pages, 9" X 11 3/8", hardcover, $15.00.

Biology, general science; Projects; Grade 6 up.

This is a general book for common Lepidoptera. It has very many exceptional photographs in color and black and white. Good diagrams. Includes: ancestry and relationships, relations with plants, food and habits, relations with other animals, specialized senses, habits and behavior, environments and distribution, and classification.

71. M; EM

Kraitchik, Maurice; Mathematical Recreations; Dover, New York; 1953; 330 pages, 5 1/2" X 6 1/4", hardcover, $1.75.

Math; Enrichment material; Grade 8 up.

This book is divided into twelve chapters: 1.Math without Numbers. 2. Ancient and Curious Problems. 3. Numerical Pastimes. 4. Arithmetico-Geometrical Questions. 5. The Calendar. 6. Probabilities. 7. Magic Squares. 8. Geometric Recreations. 9. Permutational Problems. 10. The Problem of the Queens (chess type). 11. The Problem of the Knight (chess type). 12. Games (positional and permutational).

"A servant is promised $100 and a cloak as his wages for a year. After 7 months he leaves this service, and receives the cloak and $20 as his due. How much is the cloak worth?"[14]

72. Gen Phy; Ex

Lewellen, John; Understanding Electronics; illustrated by Ida Scheif; Crowell Company, New York; 1957; 213 pages, 5 1/2" X 8 1/4", hardcover, $3.00.

General science; physics; Experiments; Grades 7 - 11.

A good general introduction to electronics. Starts with old-fashioned electricity and includes electromagnetic waves. Only a few experiments.

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[14]From Amusements in Mathematics by H. E. Dudeney reprinted by permission of Dover Publications, Inc., New York 14, New York. ($1.25).

73. Gen Phy; D Ex

Lynde, Carleton John; (1) Science Experiences with Home Equipment; D. Van Nostrand Company, Inc., Princeton, New Jersey; 1949; 230 pages, 5 1/4" X 8 1/4", hardcover, 200 experiences, $3.25.

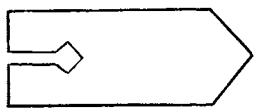
General science, physics; Demonstrations, experiments; Grades 6 - 12. Equipment as stated in title.

This book is the first of a series of three. The other two are listed separately and immediately following.

Book divided into the following classifications: Atmospheric pressure (29), flying (11), water streams (2), air streams (6), compressed air and expanded air(7), liquid surfaces (33), other properties of water (18), balance (11), experiences with your body (5), inertia (12), marbles (3), science toys (13), heat (17), and explanations.

"Boats.

Cut two or three small boats, about 1 inch long, out of writing paper, and cut a slot and pocket at the stern of each. Place a piece of camphor in each pocket in such a way that it touches the water, but does not fall out.



Float the boats in a pail, dish pan or bath tub and they will sail around for a long time."[15]

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[15]From: Lynde, Carleton, John, SCIENCE EXPERIENCES WITH HOME EQUIPMENT, Copyright, 1949, D. Van Nostrand Company, Inc., Princeton, New Jersey.

74. Gen Phy; D Ex

Lynde, Carleton John; (2) Science Experiences with Inexpensive Equipment; D. Van Nostrand Company, Inc., Princeton, New Jersey; 1950; 266 pages, 5 1/4" X 8 1/4", hardcover, 200 experiences, $3.25.

General science, physics; Demonstrations, experiments; Grades 6 - 12. Equipment: In addition to dishes, glasses, bottles, etc. used in previous book, this one includes rubber stoppers (with and without holes), glass tubing, bunsen burner (with fish tail), faucet connector and a few other inexpensive items.

The following classification of experiences is used. Baseball curves and the like (9), bouyancy of liquids (11), air pressure (5), compressed air (8), bouyancy of gases (7), air streams (11), water streams (5), liquid surfaces (18), centrifugal force (7), pendulums (6), heat engines (8), experiences with heat (18), water pressure (12), atmospheric pressure (14), siphons (11), compressed air and expanded air (20), other gases (8), liquids (9), more with heat (13), and explanations.

75. Gen Phy; D Ex

Lynde, Carleton John; (3) Science Experiences with Ten-Cent Store Equipment; D. Van Nostrand Company, Inc., Princeton, New Jersey, 1950; 262 pages, 5 1/4" X 8 1/4", 200 experiences, hardcover, $3.25.

General science, physics; Demonstrations, experiments; Grades 6 - 14; Equipment found around home, plus inexpensive items as indicated by title.

Experiences are distributed as follows: Sound (13), music (9), musical toys (11), noise (2), light, illusions, etc.(8), mirrors (16), shadow shows (6), light in water (16), lenses (18), colors in daytime (9), colors in the night (7), your eyes (28), sunlight in a dark room (6), electricity and magnetism (51), and explanations.

76. C; Ex

Manufacturing Chemists' association, Inc., Scientific Experiments in Chemistry; Henry Holt and Company, Inc., New York; 1959; 61 pages, 31 experiments, 8 1/2" X 11", paperback, price unknown.

Chemistry; Experiments; High School; Fairly well equipped chem lab.

Experiments include some of the following titles: Diffusion, Conductivity, Effect of Concentration on Rate of Reaction, Reducing action of Hydrogen Sulfide, Rubber, Preparation of DDT. Clear explanations, good diagrams

77. Gen; D Ex

Manufacturing Chemists' Association, Inc.; Superstition to Supersonics; Holt, Rinehart and Winston, Inc., New York 1956; 27 pages, 8 1/2" X 11", paperback, price unknown.

General science; Experiments, demonstration;

Grades 8 - 10. Simple experiments are suggested in the student book and demonstrations are presented in the Teachers book. The units have the following titles: Oxygen and Nitrogen Preparation, Pressure, Photography, Humidity, Solar Energy, Crystal Growth, Smoke Removal, Fuel Distillation, Plant Synthesis, Artificial Synthesis, Lignen Recovery.

Materials for extracting lignen.

"1. Sawdust
2. 2000 cc. (2 1/2 qt.) 'Pyrex' flask
3. Some 250 cc. beakers
4. One 100 cc. graduate measure
5. A glass stirring rod.
6. Ice
7. A 70% sulfuric acid solution . . .
8. Watch glass"[16]

78. Gen; Pr

Mellan, Ida M.; Fishes in the Home; Dodd, Mead and Company, New York; 1954; 178 pages, 5 1/2" X 8 ", hardcover, $3.00.

Biology, general science; Projects; Any age or grade.

Book in two parts. Part I tells about the aquarium goldfishes, native fishes and European fishes, and Part II about tropical toy fishes, sick fishes, salt water aquaria and construction of small aquaria and garden pools. 63 illustrations (mostly photographs). A complete book on fishes and their necessary (and unnecessary) companions in the home.

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[16] Reproduced by special permission of the publisher, Holt, Rinehart and Winston, Incorporated, and the Manufacturing Chemists' Association, Inc.

79. Gen; Ex

Milgrom, Harry; Matter, Energy and Change; Manufacturing Chemists' Association, Inc., Washington, D.C.; 1960; 50 pages, 8 1/2" X 11", paperback, $ .50, (4 or more copies $ .40.)

General science; Experiments; Kindergarten to 6th. Equipment from around the house or local drug (except a voltmeter).

Solutions may or may not conduct electricity. If they do, they are called electrolytes. If they do not, they are called non-electrolytes.

"Using the same circuit as in part 'a' (Simple electrical circuit with a quarter inch gap between two bare ends of wire) try this:

-Put a heap of salt between the wires. The bulb does not light.

-Remove the salt and put several drops of water on the gap. The bulb does not light.

-Add salt to the water. The bulb lights.

-Try the same thing with sugar. The bulb does not light at any time ...

Test solutions of other materials in the same way ...

Record the results -----"[17]

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[17]From: Matter, Energy and Change; by Harry Milgrom, and reproduced by permission from the publisher, Manufacturing Chemists' Association, Inc., Washington, D.C.

80. B; Ex Pr D

Miller, David F. and Blaydes, Glenn W.; Methods and Materials for Teaching Biological Sciences; McGraw-Hill Book Company, Inc., New York; 1938; 435 pages, 6 1/4" X 9 1/4", hardcover, $5.95.

Biology; Demonstrations, projects, and experiments; Grades 7 - 14.

This book is divided into two parts: Part I (10 chapters) Principles and Classroom Methods; Part II (13 chapters) Preparation and Uses of Classroom Materials. Part II suggests demonstrations and projects under the following headings: Examples of student projects, collecting, culturing and preserving, laboratory aids and substitutes, preparations for the microscope, photosynthesis, digestion, nutrition, and growth, diffusion, circulation, respiration, water relations to plants, the response of organisms, reproduction and heredity.

"Extraction of enzymes.

Proof of the Presence of Enzymes in Animals. That enzymes are present in tissues of the body and especially in glandular tissues can be shown easily in the following manner.

Materials. Six test tubes or large vials; iodine (aqueous solution); Fehling solution, living rat, guinea pig, rabbit, frog, or fish.

Remove from a freshly killed rat or other small mammal, the pancreas, which lies in the mesentery between the stomach liver, and small intestine. Remove also about 1 inch of

the small intestine near the stomach and a piece of muscle from the leg or body wall. A goldfish or grass frog can be used if a mammal is not available. It is more difficult to locate the pancreas in very small forms but the intestine can always be found. Chop these materials into bits using care not to get them mixed in any way. Macerate the tissues in separate containers and add a few cubic centimeters of water. Let these stand for 20 minutes or longer to extract any enzyme present. Pour off the liquid from each extract and add it to 10 cc. of starch in a test tube. After 3 minutes test each tube of starch with one drop of iodine. Use a check tube of starch with one drop of iodine. There is usually enough enzyme in a pancreas or small intestine to give a clear negative iodine test. Muscle and some other tissues may give a pinkish or purple color showing some enzyme effect. Subsequent boiling with Fehling solution may demonstrate the presence of sugar."[18]

81. Gen Phy; D Ex

Miller, Fred R.; Fundamentals of Electricity; D. C. Heath Co.; 1943; Boston, O.P.

Physics, general science; Demonstrations and experiments; High School; Need well equipped lab. 15 experiments, many demonstrations.

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[18]Reprinted by permission from Methods and Materials for teaching Biological Sciences by David F. Miller and Glenn W. Blaydes. Copyright 1938, McGraw-Hill Book Co., Inc.

This book was assembled for high schools during wartime as a first-level course for those planning on future courses in aviation and radio communication (presumably) in the forces. Very good diagrams and drawings.

82. B C Phy; D

Miner, Harold A., Shackleton, Robert W. and Watson, Fletcher G.; Teaching with Radioisotopes; United States Atomic Energy Commission (U.S. Government Printing Office) Washington, D.C.; 1959; 60 pages, 16 experiments, 7 7/8" X 10 1/4", paperback, $ .40.

Physics, biology, chemistry; Demonstrations; High School; Special equipment needed.

This book is a supplement to number 102. The two booklets should be used together because this one has a wealth of material for teachers which the first did not contain, including definitions, techniques of handling radioisotopes, safety and disposal, the nature of radioactivity and numerical analysis.

83. M; EM

Mott-Smith, Geoffrey; Mathematical Puzzles for Beginners and Enthusiasts; Dover Publications, Inc., New York; 1954; 284 pages, 5 1/4" X 8", paperback, $1.00.

Math; Enrichment material; Grade 8 up.

Divided into 12 sections (13 chapters) in order of complexity; Easy arithmetic puzzles, inference and interpretation, algebraic puzzles (2 groups), dissection of

plane figures, geometrical puzzles, properties of digits, permutations and combinations, probability, board games. Also included: solutions, seven appendices and a glossary.

"The Escalator. 'Henry' said the professor's wife, 'you're a mathematician. Tell me how many steps there are in that escalator'. 'Well, Martha, they certainly are difficult to count while they are moving. But if you will walk up, and count the number of steps you take from bottom to top, I think we can find the answer. I will start with you, but will walk twice as fast. Just watch me and take one step every time I take two.'

When Martha reached the top she reported that she had taken just 21 steps, while Henry had taken 28. The professor was then able to tell her exactly how many steps were in sight at one time on the moving staircase."[19]

84. C Gen Phy; D

Newton, David E.; Man and the Physical World; J. Weston Walch, Publisher, Portland, Maine; 1959; 280 pages, 8 1/2" X 11", paperback, $3.00 single, ten or more $2.50, rates on 30 or more.

Physics, chemistry, general science; Demonstration material; Grades 10 - 12. This book does not offer experiments, demonstrations or suggest projects, but because of

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[19]From Mathematical Puzzles for Beginners and Enthusiasts by G. Mott-Smith reprinted by permission of Dover Publications, New York 14, New York. ($1.00)

its photos (72), figures (129), diagrams and wealth of material any teacher, lecturer or demonstrator could use it as a source book. It also includes astronomy, geology and nuclear science.

85. Gen B; Ex

Osterhout, W. J. V.; Experiments with Plants; The Macmillan Company; 1905; 492 pages, hardcover, O.P.

Biology, general science; Experiments; Grade 3 up.

A very well written easy to read book with 253 illustrations (photos and drawings). It includes: The Awakening of the Seed, Getting Extablished, Work of the Roots, Leaves, Stems, Flowers, Fruits, How Plants are Influenced by Their Surroundings, Plants Which Cause Decay, Fermentation and Disease and Making New Kinds of Plants.

86. All Fields; Pr

Patterson, Margaret E. and Kraus, Joseph H.; Thousands of Science Projects; Science Service, Washington, D. C.; 1957; 44 pages, 5 1/2" X 8 1/2", pamphlet, $ .25, 10/$1.00.

All fields; Projects; Grades 1 up.

As the title implies this book suggests many many ideas. It is actually a list of titles of exhibits shown at science fairs and/or produced as projects for the annual Science Talent Search. Directions for using the book and a section on how to do a science project are included.

The following random sampling of titles will show the range of the suggestions in difficulty, cost and fields:

"Leaf Collection
Cross Section of a Flower
Effects of Radiation on Drosophila melanogaster
A Device for Solving Quadratic Equations
Flying Boat Hydrostatics
Construction of a One-Half Million Electron-Volt Proton Cyclotron
Home Spot Remover
Induced Resistance of B. subtilis to Penicillin
Model Water-Works
Rocket Fuels
Construction of a Cathode Ray Tube."[20]

87. Gen; Pr

Pearl, Richard M.; How To Know the Rocks and Minerals; Signet Key, (Published by The New American Library) 1955; 192 pages, paperback, pocketsize, $ .50.

General science; Projects; Grade 6 up.

An introductory guide to over 125 minerals and rocks. 46 color illustrations plus a drawing of each mineral and rock. Includes: How to build a collection, keys to rocks and minerals, and suggestions for books and magazines for collectors.

88. Gen; Pr

Pearl, Richard M.; Mineral Collectors Handbook; Mineral book Co.; Colorado Springs, Colorado; 1947; 297 pages, hardcover, $3.75.

General science; Projects

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[20] From Thousands of Science Projects by Margaret E. Patterson and Joseph H. Kraus published by Science Service, Washington, D. C.

This book is for the serious advanced collector. The following are presented: Preservation of minerals, classification of minerals, directory of mineral museums, gem identification, crystals, directory of minerals, meteorites, chemistry, tests, literature, field work (staking claims, agencies), maps and societies.

89. B Gen; Pr

Persing, Ellis C.; Insect Collecting As A Hobby; W. M. Welch Manufacturing Company, Chicago; 1953; 8 pages, pamphlet, price unknown.

Biology, general science; Projects; All ages.

Tells when to collect, where to look (summer, winter), how to rear insects and what equipment is needed.

"A Collecting Trip to a Pond.

Take along a quart fruit jar or a pail in which to bring home living specimens, and your bottle for killing adult beetles and bugs. Take a garden rake, and rake ashore the trash that lies loose on the pond bottom, rake deeply and bring ashore some of the mud and ooze with it. Many things may thus be brought entangled in the trash - even small fishes, tadpoles, and salamanders. They will make themselves evident by their movements. Many of them, if taken home alive, will make interesting aquarium specimens. Pick them up carefully and put them at once into water. Note how they float, crawl, or swim."[21]

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[21] © W. M. Welch Manufacturing Company, Chicago

90. B Gen; Pr

Peterson, Roger Tory; How to Know the Birds; published by The New American Library; 1957; 168 pages, paperback, pocket size, $ .50.

Biology, general science; Projects; Grade 4 up.

An introductory bird recognition book which contains 72 color illustrations and over 400 drawings. It describes 54 major families, tells what to look for to recognize birds, and where to look for them.

91. M; EM

Phillips, H.; Something to Think About; illustrated by Pearl Falconer, Max Parrish, London; O.P.

Math; Enrichment material; Age 10 up.

A collection of 115 problems and puzzles with solutions.

92. Gen; Ex

Podendorf, Illa; 101 Science Experiments; Childrens Press, Inc., Chicago; 1960; 160 pages, 101 experiments, 8 1/4" X 10 3/4", $3.95 (trade edition), $4.50 (cloth edition for schools).

General science; Experiments; Grades 4 - 6.

Equipment generally found around the house.

93. Gen; Ex

Podendorf, Illa; The True Book of Science Experiments; pictures by Mary Salem; Childrens Press, Chicago; 1954; 47 pages, 7 3/8" X 8 1/2", hardcover, $2.00.

General science; Experiments; Grades 1 - 3.

Large, easy to read type. Includes: air (9), magnets (4), gravity (3), water (6), sound (3), heat and cold (2).

"John is carrying some water in a straw. He holds his finger on top of the straw. Air keeps the water from running out of the straw. John took his finger off the top of the straw. Air got into the top of the straw. The water ran out. Air pushes up, down and side ways. Air pushes in all directions."[22]

94. M; EM

Rademacher, Hans and Toeplitz, Otto; The Enjoyment of Mathematics; Princeton University Press, Princeton, N.J. 1957; 6 3/8" X 9 1/2", hardcover, $4.50.

Math; Enrichment material; Grades 12 up.

It would be of utmost benefit to math classes if math teachers would read this book. The simplified approach and simple diagrams would help take some of the "hard work" out of math.

95. B Gen; Pr

Sanderson, Ivan T.; How to Know the American Mammals; Signet Key, New York; 1951; 176 pages, paperback, pocket, $ .50.

Biology (nature study), general science; Projects; Grade 4 up.

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[22]From the True Book of Science Experiments by Illa Podendorf published by Childrens Press, Chicago.

A handy booklet for identifying the common mammals of North America. Contains 20 color photographs and 183 black and white drawings. It tells what they are, where they live and how to recognize them.

96. All Fields; Pr

Science Clubs of America; Science Club Monographs; Science Service, Washington, D. C.; 5 3/8" X 8 1/4", pamphlet, $1.00 (monographs 10¢ each).

All fields; Projects; High School.

A collection of 11 monographs which tell about methods used successfully in science clubs.

Samples: 1. Putting on a show in the chem lab. 5. Making herbarium specimens. 6. Homemade photographic equipment and photo hints. 11. Aniline dyes.

97. B Gen; Pr

Science Clubs of America; Sponsor Handbook for 1960; Science Service, Inc., Washington, D. C.; 1959; 96 pages, 5 3/8 " X 8 1/2", pamphlet, $1.00.

Biology, general science; Projects; High School.

Contains a section on projects and sources of material for projects. Also a section of sources of free and low cost science materials.

98. Gen Phy; D Ex

Science Service Staff; (1 of 4) Edison Experiments You Can Do; Science Service, Inc., Washington, D.C.; 1957;

32 pages, 5 3/8" X 8 1/2", pamphlet, $ .25, ten or more copies $ .20 @. See number 101.

99. Gen Phy; D Ex

Science Service Staff; (2 of 4) More Edison Experiments You Can Do; Science Service, Inc., Washington, D. C.; 1959; 32 pages, price and size as no. 98. See 101.

100. Gen Phy; D Ex

Science Service Staff; (3 of 4) Edison and Faraday Experiments You Can Do; Science Service, Inc., Washington, D.C.; 1959; 32 pages, price and size as no. 98. See 101.

101. Gen Phy; D Ex

Science Service Staff; (4 of 4) Edison and Other Experiments You Can Do; Science Service, Inc., Washington, D.C.; 1960; 32 pages, price and size as no. 98.

General science, physics; Experiments, demonstrations; High School. These four pamphlets average approximately 2 dozen experiments each. The material is found at home or easily obtained (maximum amount about $2.00).

"For this experiment you will need a length of #30 insulated magnet wire and a 1 1/2-volt doorbell or general purpose battery. Wind the magnet wire into a coil and attach the bared ends to the two terminals of the lantern battery. After it has been connected for two minutes, touch the coil to your face. Does it feel hot?"[23]

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[23]Science Service Staff, Edison and Other Experiments You Can Do, Science Service, Inc., 1960.

102. B C Phy; D

Schenberg, Samuel; Laboratory Experiments with Radioisotopes; United States Atomic Energy Commission, (U.S. Government Printing Office), Washington, D.C.; 1958; 59 pages, 20 experiments, $ .25.

Physics, chemistry, biology; Demonstrations; High School; Special equipment needed (ex. geiger counter).

The experiments included are of an introductory nature designed as interest material and stimulus for teachers and pupils. A few of the experiment titles are: Operating the Geiger Counter, Inverse Square Law, Continuous Cloud Chamber and Translocation of Radioactive Phosphorous in Celery Stalks. Appendices include: Radioactivity and It's Measurement, Safe Handling of Radioisotopes.

#82 is a supplement to this booklet.

103. Phy; D Ex

Shaw, E. R.; Physics by Experiment; Effingham, Maynard Co., New York; 1891; O. P.

Physics; Experiments, demonstrations; High School.

If this book is available it should be checked over by the instructor. It is old, almost 70 years, but it will be noted that exactly the same experiments were used then as now, and especially noticed that simple diagrams and pictures (which can be drawn on a blackboard) are just as clear and effective as fancy photos.

104. C; EM

Sister Mary Francesca, M.S.C.; Chemistry Can Be Fun; J. Weston Walch, Publisher, Portland, Maine; 1959; 70 pages, 8" X 11", paperback, $2.50.

Chemistry; Enrichment material; Grades 8 - 12; Equipment; pencil.

Two games (FORMO & CHEMO) and a collection of cross-word puzzles. The games are played like Bingo. There are 35 cards for each game, directions, fact slips, etc. for playing. Formo deals with formulas of chemical compounds and Chemo with definitions of chemistry terms. The puzzles are for quick finishers and cover eighteen units among which are structure of the atom, halogens, semiprecious metals, organic compounds and nuclear reactions.

105. B; Pr

Smallwood, M. E.; A Living Biological Laboratory; W. M. Welch Manufacturing Company, Chicago; 1950; 20 pages, pamphlet, 8 1/2" X 11", price unknown.

Biology; Class projects; All grades. Mr. Smallwood tells how to raise, care for and keep amoeba, hydra, crustacea, entomostraca, mollusks, insects, fish, amphibians, reptiles, birds and mammals. Anyone who wants to keep lifing specimens should read this pamphlet.

106. Gen; Pr

Spilhaus, Athelstan F.; Weathercraft; The Viking Press, New York; 1951; 64 pages, 6 1/4" X 9 3/8", hardcover, $2.00.

General science; Projects; Grades 5 - 9; Equipment found around the home or five-and-dime store. 24 photographs, 9 other illustrations.

Tells how to build a rain gauge, wind vane, anemometer, thermometer, thermometer shelter, wet-bulb thermometer, hair hygrometer, nethoscope and a barometer. Each section on the construction of an instrument or device has a list of materials needed at the beginning of the section or chapter.

Also included are such things as: Finding true north, how to judge wind speed, dew point, clouds, weather log (records), weather map and forecasting.

107. C Gen; D Ex

Sprague, Norman G.; Basic Laboratory Practice; Chemical Publishing Co., Inc.; 1941; O.P.

Chemistry, general science; Teacher demonstration, experiments; Teachers.

This is a very good book on behavior and technique in the lab. It starts upon entry into the lab explaining about dress, posture, health, first aid, fire, telling what and what not to do and why. The techniques are explained clearly using photos and drawings.

Other units are: Preparation of some very simple and essential equipment, some general operations with liquids and solutions, filtration, dish-washing, chemicals that entail special difficulties and dangers, and study habits.

108. Phy; D Ex

Stephenson, R. J.; Exploring in Physics; University of Chicago Press, Chicago; 1935; 205 pages, 6 5/8" X 9 1/4", paperback, $2.25.

Physics; Experiments, demonstrations.

This book includes all of the usual fields within physics including electromagnetic radiations, waves and particles. Simple lab materials necessary. The book is relatively old but what it covers is well done with effective diagrams and drawings.

109. Phy; D Ex

Sutton, Richard Manliffe; Demonstration Experiments in Physics; McGraw-Hill Book Company, Inc., New York; 1938; 545 pages, 6 1/4" X 9 1/4", hardcover, $7.90.

Physics; Demonstrations, experiments; Grades 10 up. Equipment; Well equipped physics lab. 1189 demonstrations or experiments.

The book is divided as follows: Mechanics (328), Wave Motion and Sound (153), Heat (182), Electricity and Magnetism (269), Light (136), Atomic and Electronic Physics (121).

"E-117. Electrostatic Motor. A relatively large static machine is connected to a smaller one. When the larger machine is turned, the energy is sufficient to operate the smaller one as a motor. The drive belt should be removed from the smaller machine to reduce friction.

A similar experiment may be performed with a single machine and a battery of about four Leyden jars connected in parallel. The machine is first turned to charge the condensers. The drive belt is then removed, whereupon the machine stops and then reverses its direction of rotation because the stored energy is being given back. (The experiment with one machine used to turn another is analogous to that of a generator operating a motor, while the experiment with a single machine and battery of Leyden jars is analogous to that of a generator used for charging a storage battery, the battery subsequently being used to operate the generator as a motor.)"[24]

110. C Gen Phy; D Ex

Swezey, Kenneth M.; (1 of 3) After-Dinner Science; McGraw-Hill Book Company, Inc., New York; 1948; 182 pages, 111 experiments, 6 1/4" X 9 1/4", hardcover, $4.95.

Physics, chemistry, general science; Experiments, demonstrations; Grades 7 - 12. Equipment: Most items can be found around the house, but there are some chemicals necessary that are not ordinarily found around the home.

Experiments as follows: Facts about air (6), baseball curves, airplanes and jet propulsion (7), water (8), heat, cold, and the weather (10), gravity (8), forces and inertia (7), sound waves and resonance (9), light and mirrors (10),

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[24]Reprinted by permission from Demonstration Experiments in Physics by Richard Manliffe Sutton. Copyright 1938 McGraw-Hill Book Company.

electricity and magnetism (8), your senses (11), getting acquainted with chemistry (8), chemistry in the home (8), chemistry in industry (7), fire-fighting chemistry (4). The book also contains 200 photographic illustrations.

111. C Gen Phy; D Ex

Swezey, Kenneth M.; (2 of 3) Science Magic; McGraw-Hill Book Company, Inc., New York; 1952; 182 pages, 6 1/2" X 9 1/4", hardcover, $4.95.

Physics, chemistry, general science; Demonstrations, experiments; Grades 7 - 12. Equipment; Most items found at home or local drug store.

Experiments as follows: Jet planes, forces and power (8), gravity and balance (10), matter is lazy (7), lampwicks and liquid spheres (6), static electricity (7), magnets and electric currents (7), fire and heat (10), ice, cold and man-made rain (8), light - visible and invisible (6), illusions (7), cosmic rays and atomic energy (5), chemical magic (7), chameleon chemistry (8), scientific sleuthing (6).

112. C Gen; D Ex

Swezey, Kenneth M.; (3 of 3) Chemistry Magic; McGraw-Hill Book Company, Inc., New York; 1956; 180 pages, 200 experiments, 183 photographs, 6 1/4" X 9 1/4", hardcover, $4.95.

Chemistry, general science; Experiments, demonstrations; Grades 9 up. Equipment; The equipment for chemistry is necessarily more specific and somewhat more expensive. You will need materials found in most high school labs:

Supports (ring stand, tripod), bunsen or Fisher burner, glassware (tubes, beakers, flasks, pipettes), porcelain crucibles, measuring tools (cylinders, scales, thermometers), stoppers, glass and rubber tubing, clamps, brushes, etc.

113. B Gen; Ex Pr

Teale, Edwin Way; The Junior Book of Insects; illustrated by the author; E. P. Dutton and Company, Inc., New York; 1953; 249 pages, 5 1/2" X 8 1/8", hardcover, $3.75.

Biology, general science; Projects, experiments; Grades 5 - 8.

A complete book for youngsters (or oldsters) with many side lights not included in more technical books. Chapter titles include: The Insect World, The Fun of Collecting, Making Your Equipment, Collecting with a Camera, Insect Aquariums, Insect Experiments You Can Make, Hunting with a Flashlight, Keeping an Insect Zoo, Life Histories, Winter Work plus 15 chapters on insect orders and families.

"Watch the path a marked ant takes out from the nest in search of food. Place a bit of meat in front of it and then see if it follows exactly the same path back to the nest or if it takes a 'bee line' home. ...
Break the trail left by an ant with onions, perfume, ammonia and other strong-smelling fluids and see if the ants, following the path, are thrown off the trail at these points."[25]

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[25]From The Junior Book of Insects by Edwin Way Teale copyright 1953 by E. P. Dutton & Company, Inc., New York.

114. Phy; Pr

Texereau, Jean; How To Make a Telescope; Interscience Publishers, Inc., New York; 1957; 191 pages, 6 1/2" X 10 1/4", hardcover, $3.50.

Physics; Projects; This book describes in detail: How to choose the size telescope to build, a step by step explanation of how to build and test it (8") and how to use it.

115. B C Phy; Pr

Tyson, Joe W.; Atomic Radiation in the High School Science Class; Oldfriends' Books, Austin, Texas; 1959; 87 pages, 8 3/4" X 10 3/4", paperback, $1.65 (over 10 copies 10% discount).

Biology; Experiments, projects; High School.

Good protective equipment and monitoring devices absolutely necessary.

36 experiments and 14 projects most of which are biological. Some of the equipment and experiments can be used in Chemistry and Physics.

116. B Gen Phy; D Ex

UNESCO; Unesco Source Book for Science Teaching; UNESCO, New York; 1956; 222 pages, 6 1/4" X 9 5/8", hardcover, 700 experiments, $3.00.

General science, physics, biology; Experiments, demonstrations; Grades 1 - 12. This book starts with some very good suggestions on teaching and on the using of resources.

Then a very enlightening chapter on how to make some general pieces of equipment. The diagrams throughout the book make it an exceptional book. The different chapters suggest experiments and materials for the study of plants, animals, rocks, soils, minerals, fossils, astronomy, air, air pressure, weather, water, machines, forces, inertia, sound, heat, magnetism, electricity, light, human body plus a chapter on care, cleaning and preparation of materials. Also included are nine useful appendices.

"Insect Killing Jar.

Secure a wide-mouth glass jar with a screw top or one which closes very tightly. Place a wad of cotton in the bottom and cover it with a round piece of cardboard or blotting paper which has several holes punched through it. When the jar is used saturate the cotton with carbon tetrachloride (Carbona) or some available insecticide containing DDT. Place the piece of cardboard over the cotton and then put the insect in the jar. Close the jar tightly and leave until the insect has been killed. If moths or butterflies are being prepared be certain that the jar opening is large enough to prevent the tearing of the wings."[26]

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[26]UNESCO; Unesco Source Book for Science Teaching; UNESCO; New York; 1956.

117. Phy; Pr

Upton, Monroe; Electronics for Everyone; Devin-Adair; New York; 1959; 386 pages, $6.95. (New American Library, paper edition, $ .50).

Physics; Projects (radio, electronic); High School.

This book should be recommended to any student interested in radio or electronics in general. Mr. Upton starts with atoms and electrons and ends up with satellite and missile electronics, all in an easily read style with plenty of diagrams for clarity.

"The effect of heat upon all matter, whether solid, liquid, or gas, is to speed up the movement of the molecules. Gas 'pressure' is merely the bombardment of the walls of its container by the restless molecules. In a solid the closely packed molecules are almost quiet, though there is still some movement at ordinary temperatures. To quiet the molecules completely, it would be necessary to reduce the temperature of the solid to absolute zero. ... When a metal is heated to the boiling point, some molecules escape, like steam from a boiling kettle. The blackening on the inside surface of an old light bulb is a deposit of tungsten that has slowly 'evaporated' from the filament. Naturally, such a molecular disturbance seriously disturbs the electrons that make up a current flow. The circuit of Fig. 46 illustrates this.

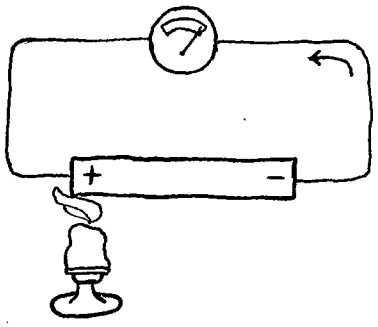

Fig. 46. Heat creates a current flow. Electrons are forced out of the hot end of the metal bar into the cold end. This leaves the heated end positively charged, while the extra electrons at the cold end charge it negatively. The unbalanced condition causes a current flow through the meter in the direction shown."[27]

118. B C Phy; Ex

Visner, Harold and Hechtlinger, Adelaide; Easy Science Experiments for the Elementary Grades; Franklin Publishing Company, Inc., Palisade, N.J.; 1960 (July); hardcover, 6" X 9", 300 experiments, $5.00 (25% educational discount on 5 or more copies). Also see #119

Biology, chemistry, earth science, physics; Experiments (75 in each field); Grades 4 - 6 (100 experiments each). Equipment: Simple, as found in household, dime store, and laboratory kits, such as glass jars with lids, tin cans, sheets of paper, pins, thermometer, etc.

"The experiments have been carefully selected to cover the most important facets of the four areas listed above

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[27]From Electronics for Everyone by Monroe Upton published by Devin-Adair, New York, 1959.

and arranged in the order of difficulty under each grade. There will be one experiment per page with subheads: Things Needed; Procedure; Explanation. The instructions and explanatory notes are written in simple terms chosen from the vocabulary of children of the respective age groups. Each experiment will have one to three illustrations, possibly simple line drawings with background in color. The books will be printed in large legible type and short lines on good paper. Every effort will be made that the books are useful to pupils and teachers alike. They will bring science within the easy reach of children of average and even below average intelligence, arouse their curiosity, and start them on the path of scientific thinking."[28]

119. B C Phy; Ex

Visner, Harold and Hechtlinger, Adelaide; Easy Experiments for the Intermediate Grades; Franklin Publishing Company, Inc., Palisade, N.J.; 1960 (Oct); hardcover, 6" X 9", $5.00 (25% educational discount on 5 or more copies). See #118 above for resume'.

120. B; Pr

W. M. Welch Scientific Company; The Schoolroom Aquarium, Its Establishment and Care; W. M. Welch Manufacturing Company, Chicago; 1957; 8 pages, pamphlet, 7 1/8" X 10 1/4", price unknown.

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[28]Quoted from a letter from Irene E. Berck, Ph.D., Editor, Franklin Publishing Company, Inc.

Biology; Class projects; Any age; Tells how to choose size and location of aquarium, how to prepare, plant, light heat, and maintain it. Also includes notes on plants, goldfish, tadpoles, newts and salamanders, turtles and alligators, snails, native fishes, clams, tropical fish and salt-water animals.

"Common and popular live-bearing varieties easy to raise are: Guppies, mollies, swordtails and platys. Common egg layers are: Tetras, (including neons), rasboras, danios (including zebra fish), cichlids (including angelfish), gouramis, bettas, and various catfish. Do not place goldfish, tadpoles, newts, salamanders, turtles or alligators in the same tank with tropical varieties."[29]

121. All Fields; D Pr

Welte, Arden F., Dimond, James and Friedl, Alfred; Your Science Fair; Burgess Publishing Company, Minneapolis; 1959; 103 pages, spiral type paperback, 8 1/2" X 10 1/4", O.P.

All Fields; Projects, demonstrations; Grade 4 up.

A complete book on science fairs. It includes the definition, the history and the "why" of the science fair. It tells how to conduct the fair including personnel, time table, publicity, financing, stimulation of interest, listing entrants, setting up projects, judging arrangements,

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[29] © W. M. Welch Manufacturing Company, Chicago

public viewing (open house), awards, follow-up procedures and trouble spots. Also included is a list of (150) projects, an annotated list of projects with photographs and some complete scientific reports by students who have made outstanding projects.

122. C; D Ex Pr

Westmeyer, Paul; Successful Devices in Teaching Chemistry; J. Weston Walch, Portland, Maine; 1959; 260 pages, 8 1/2" X 11", paperback, $3.00.

Chemistry; Demonstrations, experiments, projects; High School.

This is more or less a teaching manual and would be of special use to a beginning chemistry teacher or the unlucky one tabbed to teach chemistry because he or she is the only one available (which is often the case).

The ideas presented came from chemistry teachers of 36 different states. A good book.

123. B Gen; Pr

Whittemore, Richard D. (editor); Garden Ideas and Projects; Doubleday and Company, Inc., New York; 1959; 532 pages, 5 3/4" X 8 1/2", hardcover, $3.95.

Biology, general science; Projects; Grade 6 up.

Divided into seven sections: Tools and equipment, around the garden projects with wood, around the garden projects with masonry, special gardens (includes a garden to attract the birds) and the home gardener's self-pro-

nouncing dictionary of plant names (Generic and specific plant names). Also many good illustrations and diagrams.

124. Gen; Ex

Wyler, Rose; The First Book of Science Experiments; pictures by Ida Scheib; Franklin Watts, Inc., New York; 1952; 62 pages, 7 1/4" X 8 3/4", 62 experiments, hardcover, $1.95.

General science; Experiments; Grades 1 to 6.

Equipment found in home or at local drugstore for very little cash.

"Homemade Rainstorm.

You can make a little rainstorm with just a dry jar and a teakettle or coffee pot filled with water. As you heat the water in the kettle, it evaporates, forming invisible vapor. When the vapor hits the air and cools, droplets of water form. These make a little cloud that you can see. Hold the jar mouth downward over the spout of the hot kettle and collect the mist. Droplets will gather inside the jar.

Since the jar is cooler than the air around the kettle spout, the droplets on the glass will come together and grow into bigger drops. These will fall downward like regular raindrops."[30]

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[30]From The First Book of Science Experiments by Rose Wyler published by Franklin Watts, Inc., New York, 1952.

125. Gen; Ex Pr

Yates, Raymond E.; Weather for a Hobby; Dodd, Mead and Company, Inc., New York; 1946; 172 pages, 5 5/8" X 8 1/4", hardcover, $3.00.

General science; Projects, experiments; Grade 6 up.

This is a very good book for the beginner for constructing and using weather instruments. Includes a few experiments with air and air pressure.

126. B; Pr

Zim, Herbert, S. and Cottam, Clarence; Insects: A Guide to Familiar American Insects; illustrated by James Gordon Irving; Golden Press, Inc., New York; 1956; 160 pages, pocket size, paperback, $1.00.

Biology (Zoology); Projects; Grades 7 up.

Book has 16 orders, 225 species in full color of common easily identified insects. It contains a general key for orders, and several pages telling: what insects are, about insect relatives, relation to man, the insects place in nature, insect structure, control of insects and a short resume' on how to collect them. Shaded range maps are used to show approximate distribution in the United States, Northern Mexico and Southern Canada.

127. B; Pr

Zim, Herbert S. and Martin, Alexander C.; Flowers: A Guide to Familiar American Wildflowers; Golden Press, Inc., New York; 1945; 157 pages, pocket size, paperback, $1.00.

Biology (botony); Project; Jr. High up.

This is a color key identification book. The upper outside corner of the pages are tinted. Find a flower, check the color, flip the book open at that color, check the shaded (tinted) range map at the bottom of the page to see if the flowers illustrated occur where you have found your specimen. The book includes 134 paintings in full color showing about 20 kinds of flowers.

128. C Gen; Pr

Zim, Herbert S. and Shaffer, Paul R.; Rocks and Minerals: A Guide to Familiar Minerals, Gems, Ores and Rocks; illustrated by Raymond Perlman; Golden Press, New York; 1957; pocket size, paperback, $1.00.

General science, chemistry; Projects; Grade 7 up.

400 illustrations in color. Book includes an introduction to the earth, its crust, where and how to collect, how tc identify specimens. For the real rock hounds it tells about optical properties, crystal forms, hardness, specific gravity, cleavage, color, ultraviolet light, magnetism, electrical properties, heat, geiger counters, blowpipe tests, bead tests, flame tests and tube tests.

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Abingdon Press
150 Fifth Avenue, New York 11, New York.

American Book Company
55 Fifth Avenue, New York 3, New York.

American Radio Relay League, Inc.,The
West Hartford 7, Conn.

Basic Books, Inc.
59 Fourth Avenue, New York 3, New York.

G. Bell & Sons, Ltd.
York House, Portugal Street, London, W.C. 2, England

Capitol Publishing Company, Inc.
737 Broadway, New York 3, New York

Chemical Publishing Company, Inc.
212 Fifth Avenue, New York 3, New York

Childrens Press, Inc.
Jackson Blvd and Racine Avenue, Chicago 7, Illinois

The John Day Company, Inc.
62 W. 45th Street, New York 36, New York

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